بسم الله الرحمن الرحيم

(قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ).

صدق الله العظيم

سورة البقرة أية (32)

EFFECT OF TREADMILL VERSUS STATIONARYBICYCLE ON INTERLEUKIN 6IN PATIENTSAFTER RENAL TRANSPLANTATION

By

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Introduction

Chronic kidney disease (CKD), also known as chronic renal disease, is a progressive loss in renal function over a period of months or years. The symptoms of worsening kidney function are non-specific, and might include feeling generally unwell and experiencing a reduced appetite (Hricik et al., 2002).

Renal transplantation is the surgical placement and vascular integration of a human kidney from a living or cadaveric donor into a patient who has end stage renal disease (ESRD). It is considered the only treatment that restores reasonably normal kidney function and health although renal transplantation brings many benefits to patients; it is potentially associated with a number of drawbacks, which include constant risk of rejection and the need to comply with a complex medication regimen capable of producing pronounced side effects (Aaseb et al., 2005).

Interleukin -6 is a protein that in humans is encoded by the IL6 gene- that acts as both, proinflammatory and anti-inflammatory cytokine. It's secreted by T-cells and macrophages to stimulate immune response. IL-6 is also a "myokinge" a cytokine produced from muscle, and is elevated in response to as contraction. It's significantly elevated with exercises and precedes the appearance of other cytokines in the circulation. During exercise it's thought to act in hormone like manner to mobilize extra cellular subtracts and/or augment substrate delivery (Petersen and Pedersen, 2005).

Statement of the problem:

For patients affected by end-stage renal disease, renal transplant represents a dramatic improvement of quality of life. Since elevated levels of IL-6 represent a trigger factor of inflammation, they may significantly contribute to the cardiovascular risk of RTRs (Cueto-Manzano et al., 2005).

Therefore, from the rehabilitative point of view the problem of this study was stated in questioner form:

Did treadmill and stationary bicycle have an effect on interleukin 6 in patients after renal transplantation?

Purpose of the study.

- **The aim of this study was to compare between the effect of treadmill and stationary bicycle as physical therapy approaches in decreasing of interleukin 6 in patients after renal transplantation.**

SIGNIFICANCE OF THE STUDY:

Therefore, the aim of this research was to investigate the effect of treadmill and stationary bicycle as modes of the aerobic exercise on interleukin 6 in patients after renal transplantation, which may reduce of the risks of cardiovascular disease, and produce improvement of the biology of transplantation, the increase of energetic metabolism, and allows for a better quality of life in these subtypes of patients.

SUBJECTS, MATERIALS AND METHODS

The study was designed to determine the effectiveness of treadmill and stationary bicycle as physical therapy approaches in decreasing of interleukin 6 in patients after renal transplantation.

In this chapter, the materials and methods were presented under the following headings:

I- Subjects:

Forty volunteers' patients of both sexes who undergone renal transplantation were selected and recruited randomly from Police Academy Hospital. Patient's ages ranged from 30-45 years

1.1.Groups Design of the study:

These patients were divided into two equal groups in number

- **Group A (treadmill group):**

In this group of the study, twenty renal transplant recipients' patients received aerobic exercise on treadmill device for 30 minutes 3 times per week for 12 week.

- **Group B (stationary bicycle group):**

In this group, twenty renal transplant recipients' patients received aerobic exercise on stationary bicycle for 30 minutes 3 times per week for 12 week.

1.2 Criteria of patient selection:

- The patients had the following criteria:

1.2.(a)Inclusion criteria:

- Patients of both sexes undergone renal transplantation.
- Their age ranged from 30-45 years old.
- All patients had the same medical and nursing care.
- All patients were received a good explanation of treatment and measurement device.
- They were free from genitourinary infections.
- They were neurologically free.

1.2.(b)Exclusion criteria:

- **Patients had excluded from this study for any of the following cases:**
- **Uncooperative patients**
- **Instability of patient's medical condition.**
- **Association of another medical problem.**
- **Patients who had diabetes.**
- **Patients who had history of medical chronic relevant diseases.**
- **Patients who had acute or chronic hepatitis.**
- **Patients who had pacemaker.**
- **Patients who had genitourinary infections**

2- Instrumentations and Materials:

The main equipment and tools that were measured in the current study were classified into two main categories, measuring equipment and tools and therapeutic equipment.

Fig. (1): Treadmill device

Fig. (2): Stationary bicycle device

3. Procedures of the study:

A verbal explanation about the important justification and main point of achievement of the study was explained to every patient. The procedures of the study were divided into two main categories:

Method:

- **Measuring equipment:**

Blood analyzer and blood sample: to measure the level of interleukin 6.

Fig. (3): Venous blood sample

Group A (treadmill group):

- **Each session of exercise contains the following categories:**

a- Warming up exercise: light walking for 5 minutes. 34

b- Active phase: walking on a treadmill for 20 minutes.

c- Cool down exercise: light walking for 5 minutes

Parameter of the program:

Mode: **Walking on a treadmill.**

Duration: **30 minutes in total (Painter et al., 2002).**

Intensity: **60-70% of maximum heart rate (moderate exercise).**

(Karvonen formula): **MHR=220-Age**

Fig. (4): Aerobic exercise on treadmill device

Group B (stationary bicycle group):

- **Each session of exercise contained the following categories:**

a- Warming up exercise: light walking for 5 minutes.

b- Active phase: walking on a bicycle for 20 minutes.

c- Cool down exercise: light walking for 5 minutes

Parameter of the program:

Mode: **Walking on a stationary bicycle.**

Duration: **30 minutes in total.**

Intensity: **60-70% of maximum heart rate (moderate exercise).**

(Karvonen formula); **MHR=220-Age**

Fig. (5): Aerobic exercise on stationary bicycle


RESULTS

I- General characteristics of the subjects:

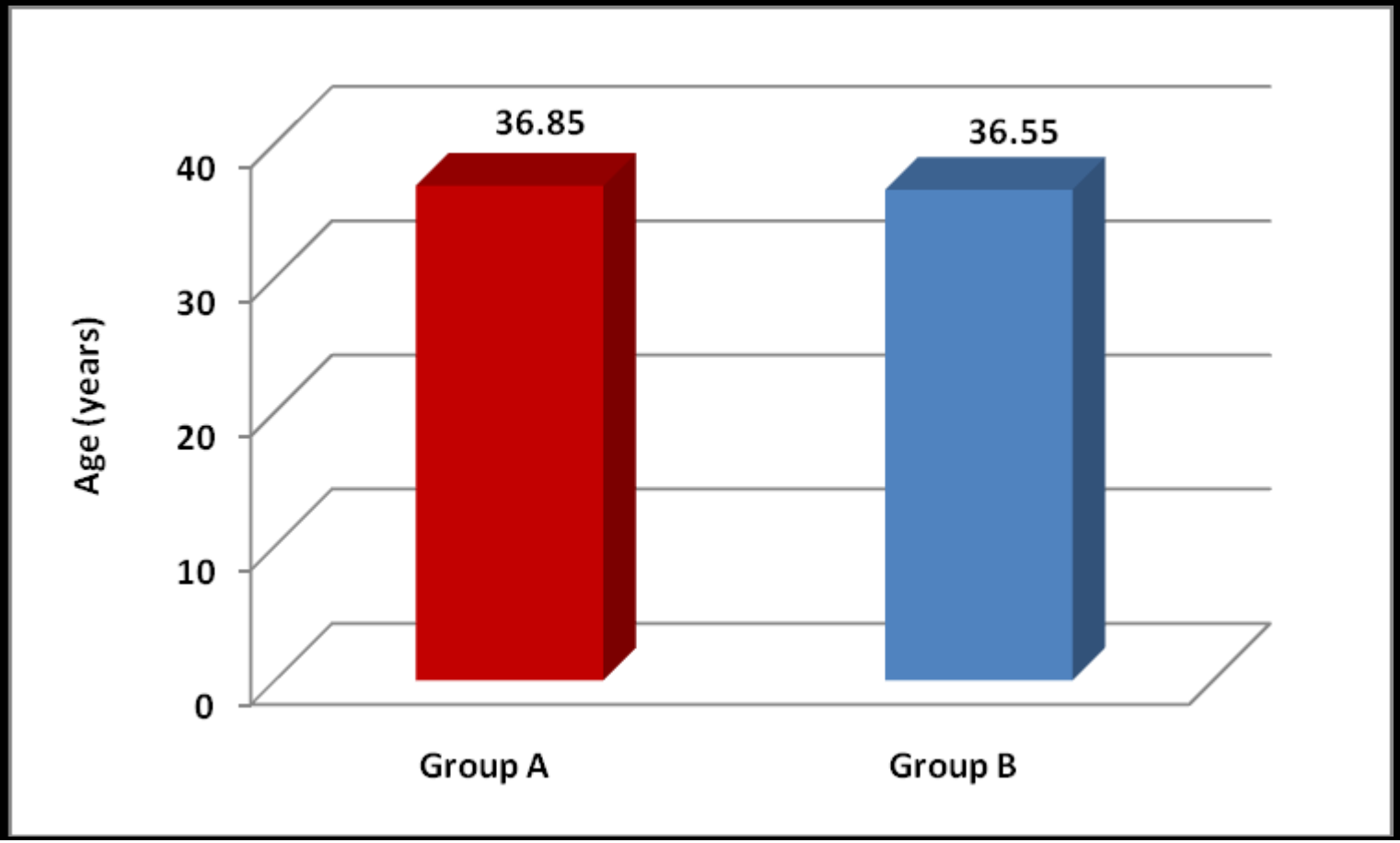


Fig. (6): Mean age (years) for both groups (A and B).

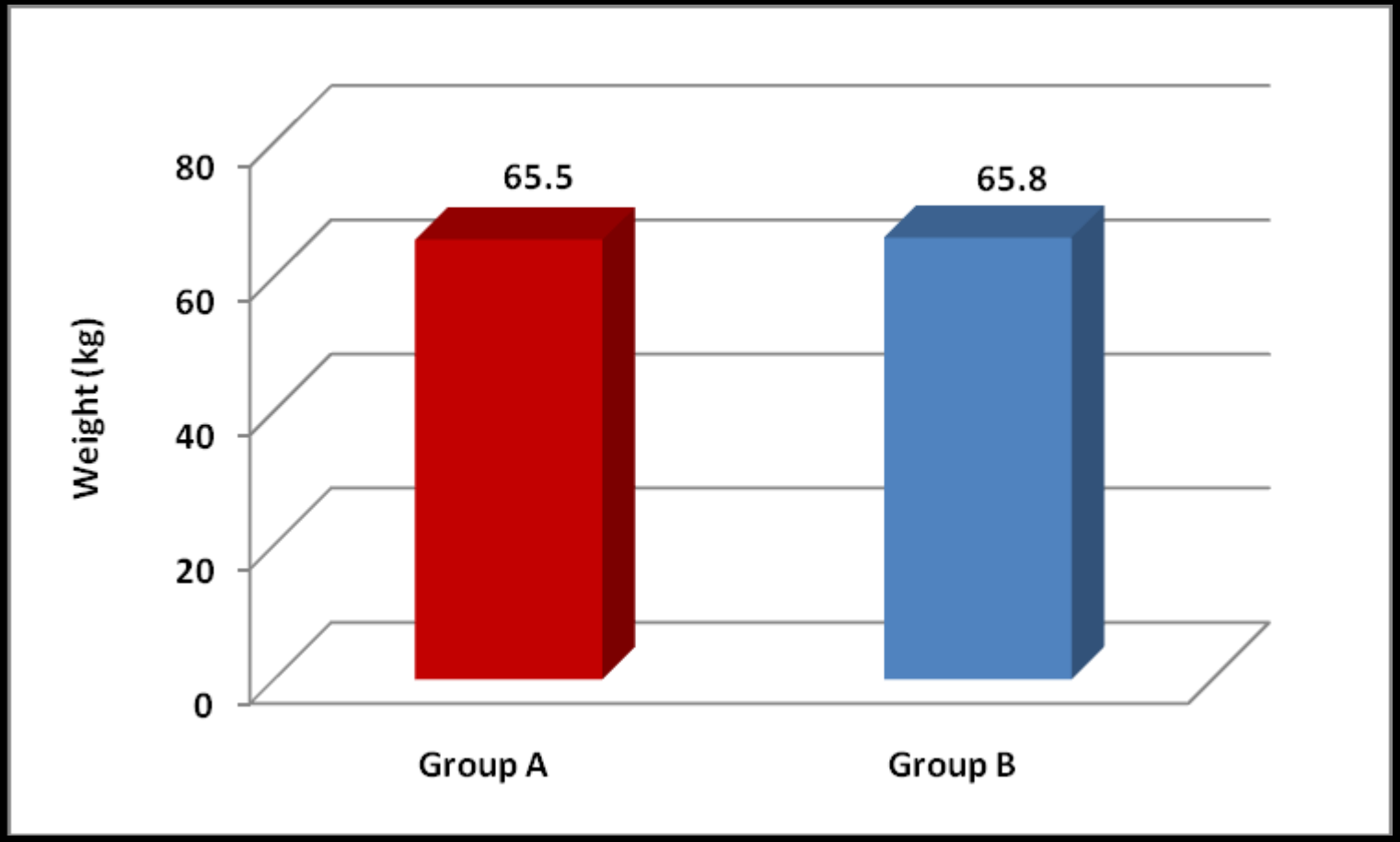


Fig. (7): Mean weight (kg) for both groups (A and B).

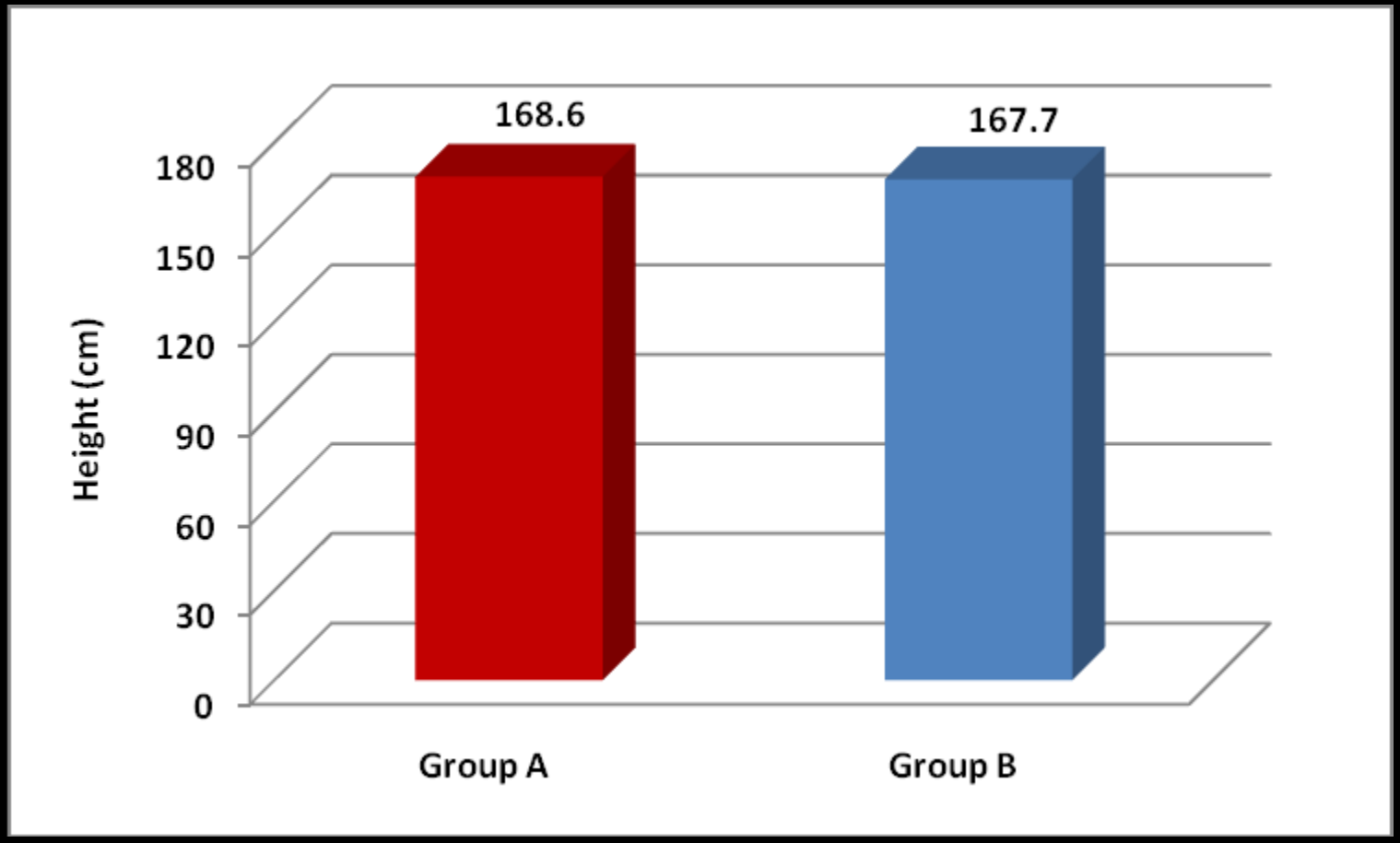


Fig. (8): Mean height (cm) for both groups (A and B).

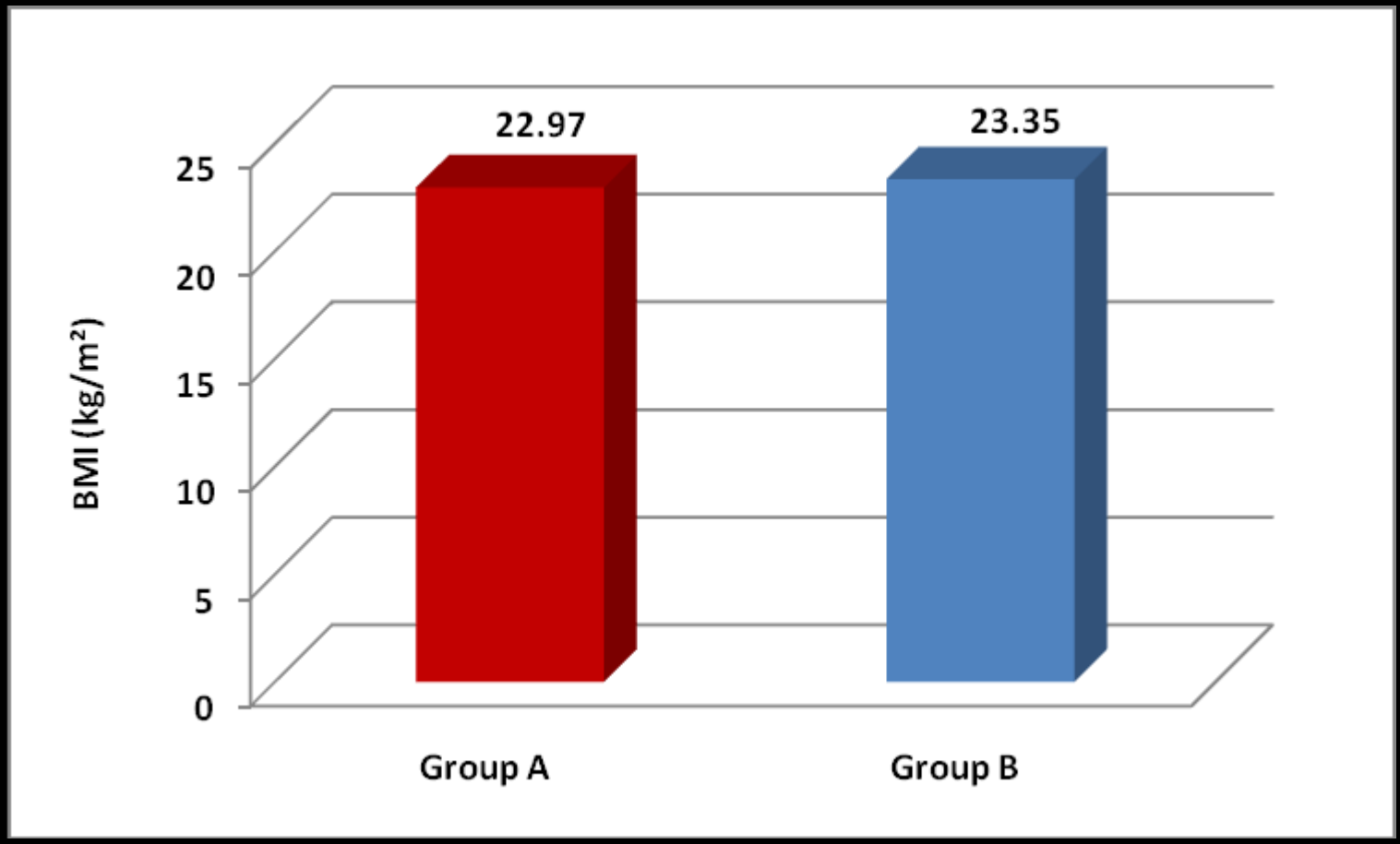
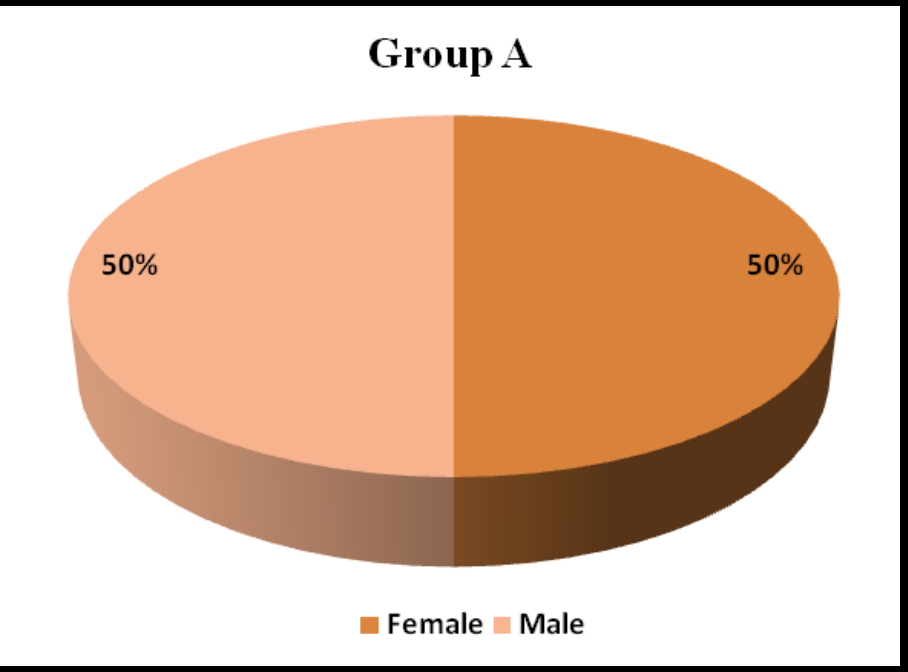


Fig. (9): Mean BMI (kg/m²) for both groups (A and B).

II- Sex distribution:



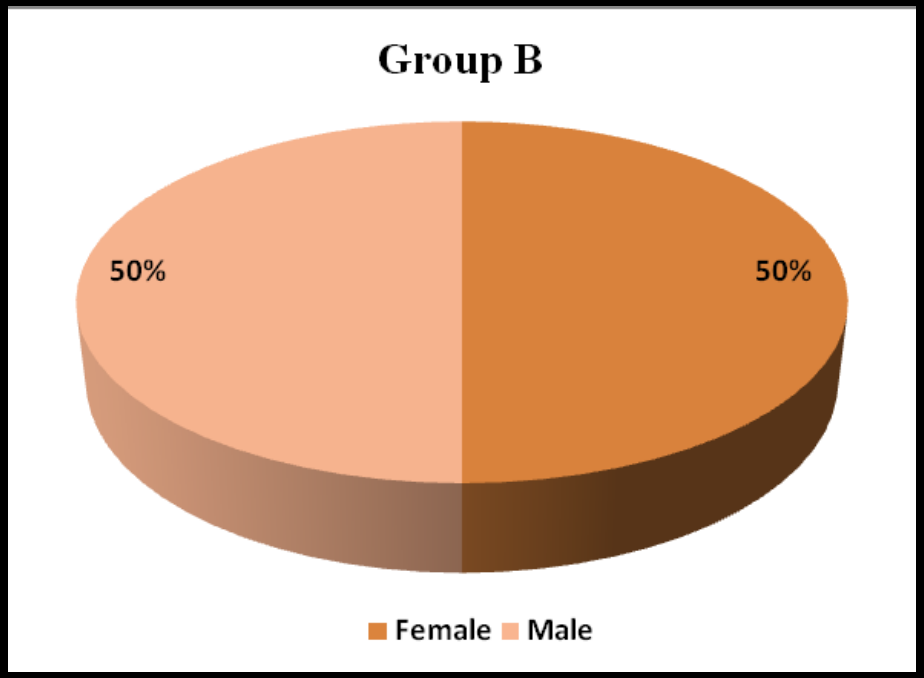


Fig. (10): Sex distribution of group A and B.

III-Interleukin 6:

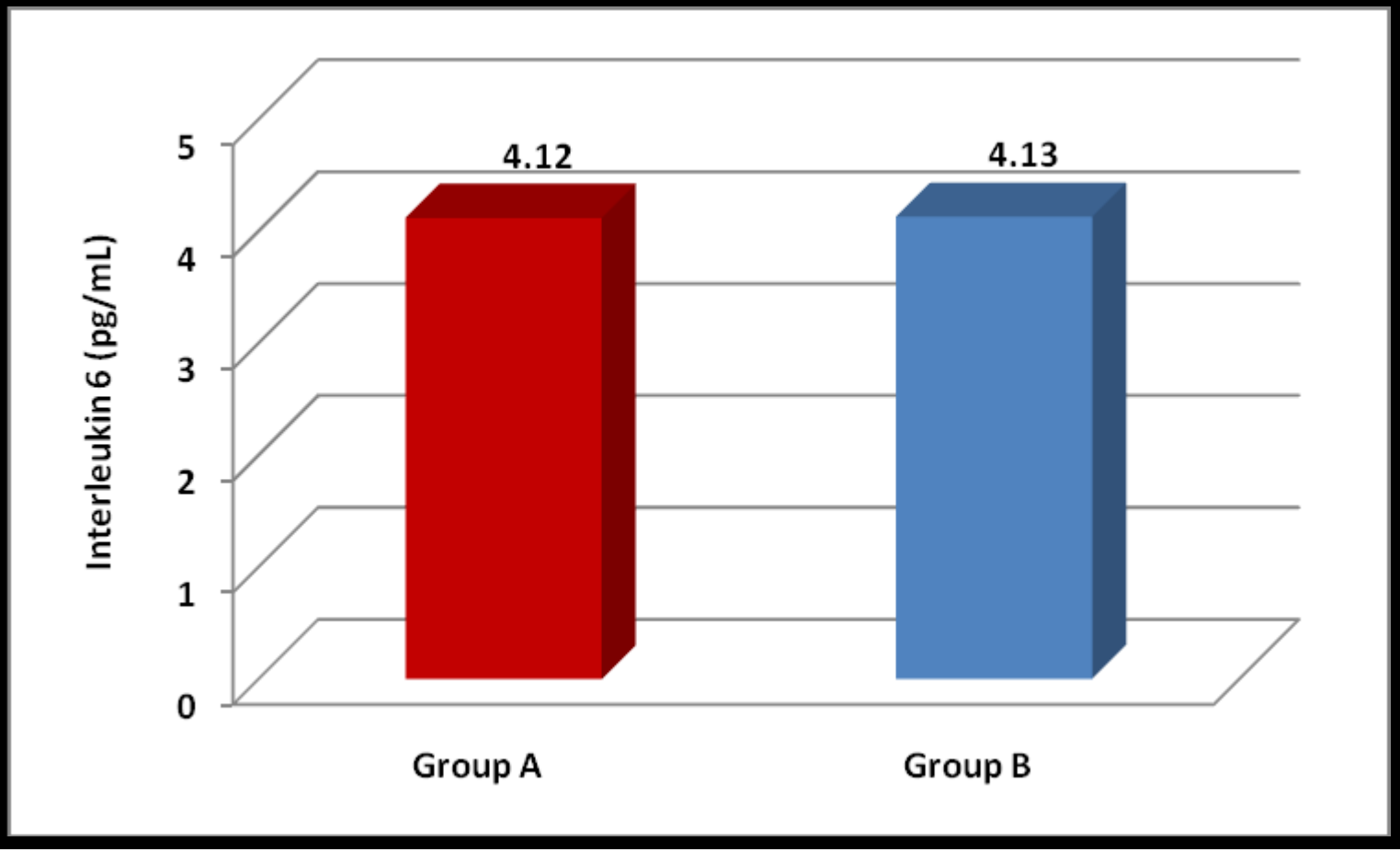


Fig. (11): Pre treatment mean values of interleukin 6 of group A and B.

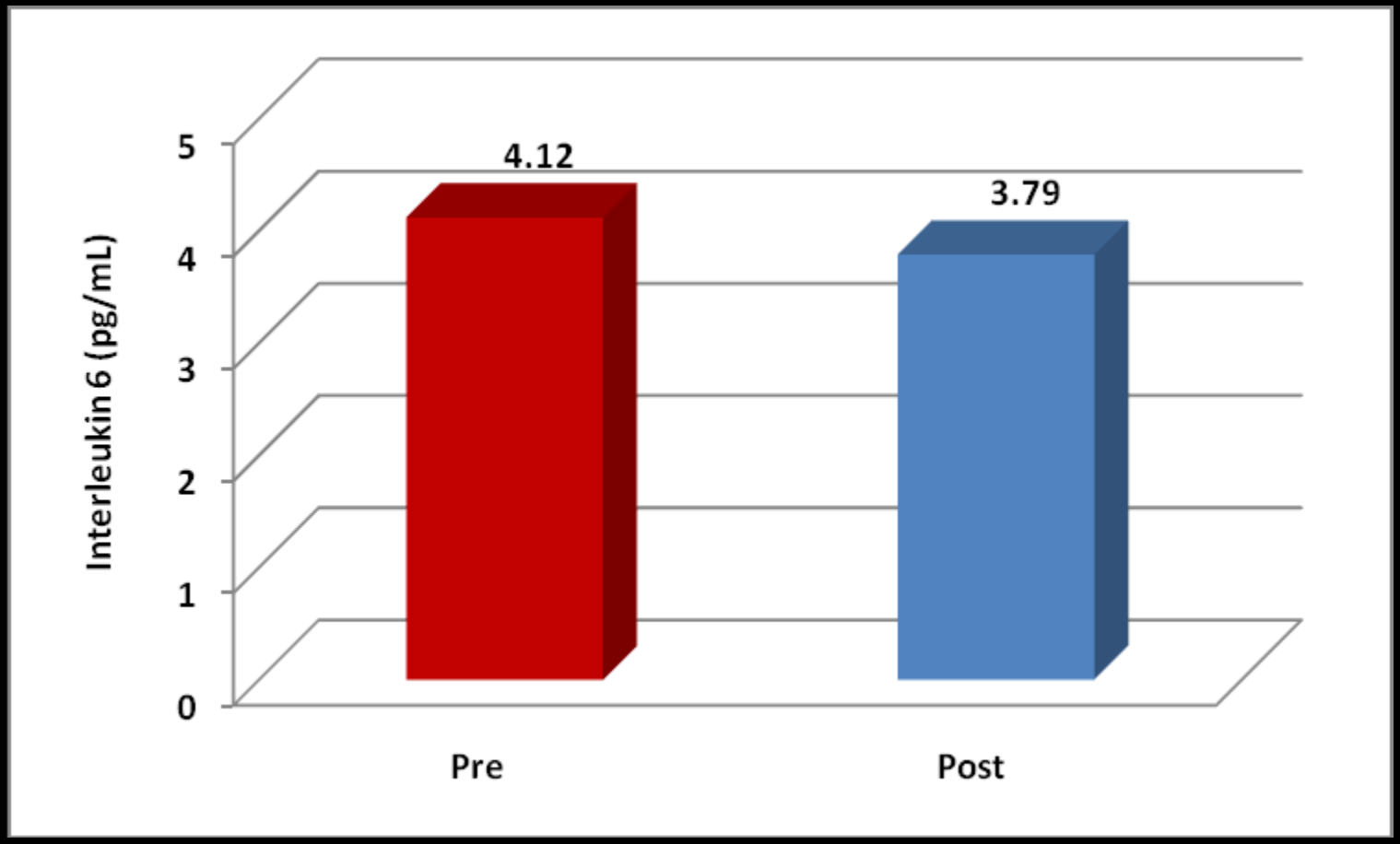


Fig. (12): Pre and post treatment mean values of interleukin 6 of group A.

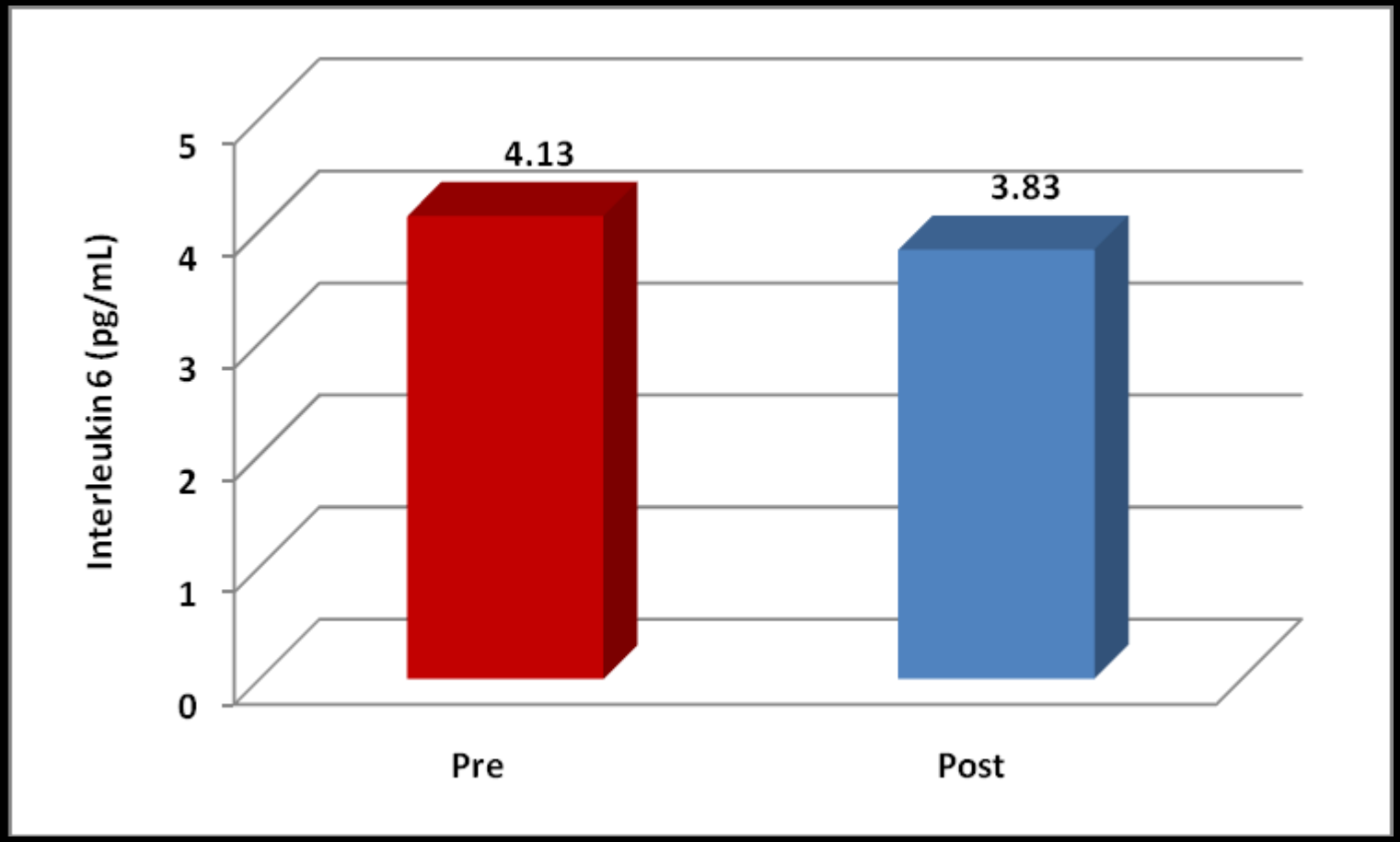


Fig. (13): Pre and post treatment mean values of interleukin 6 of group B.

4. Post treatment mean values of interleukin 6 of both groups (A and B):

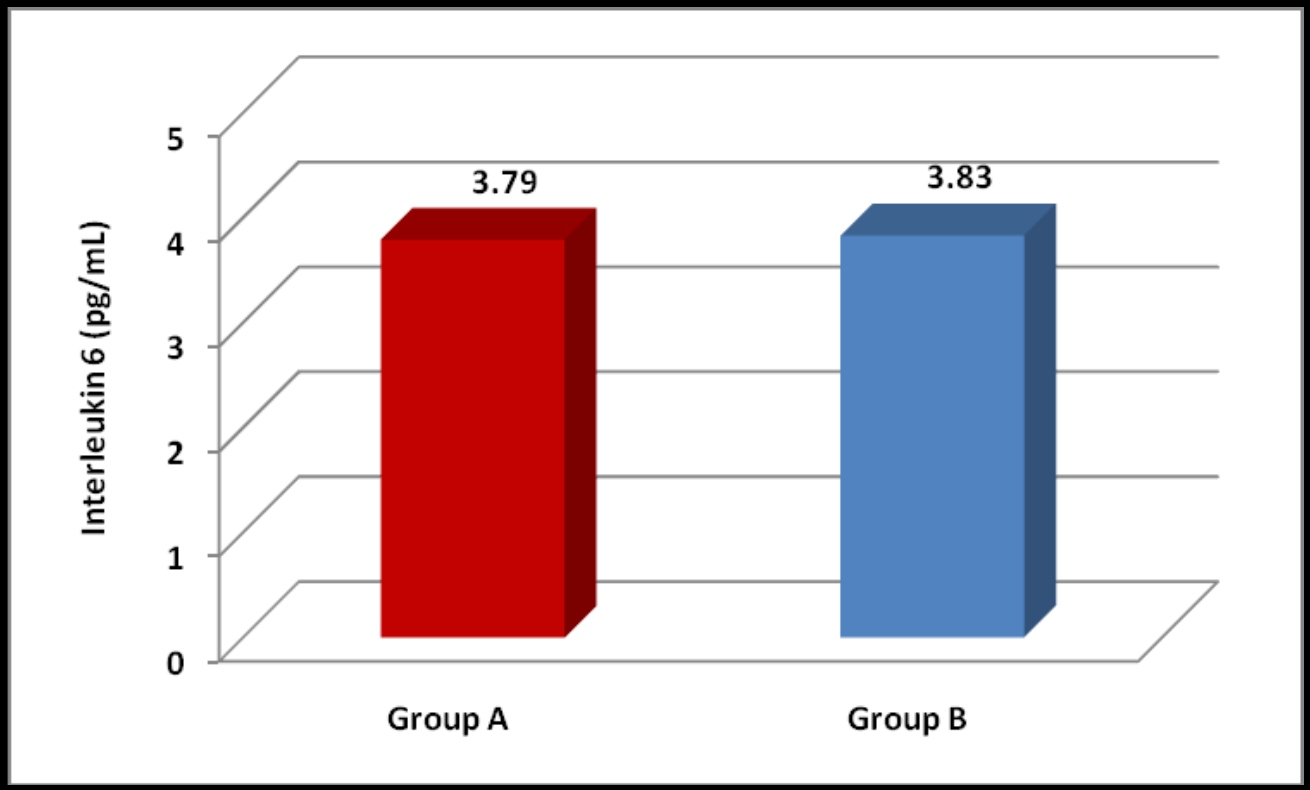


Fig. (14): Post treatment mean values of interleukin 6 of group A and B.


DISCUSSION

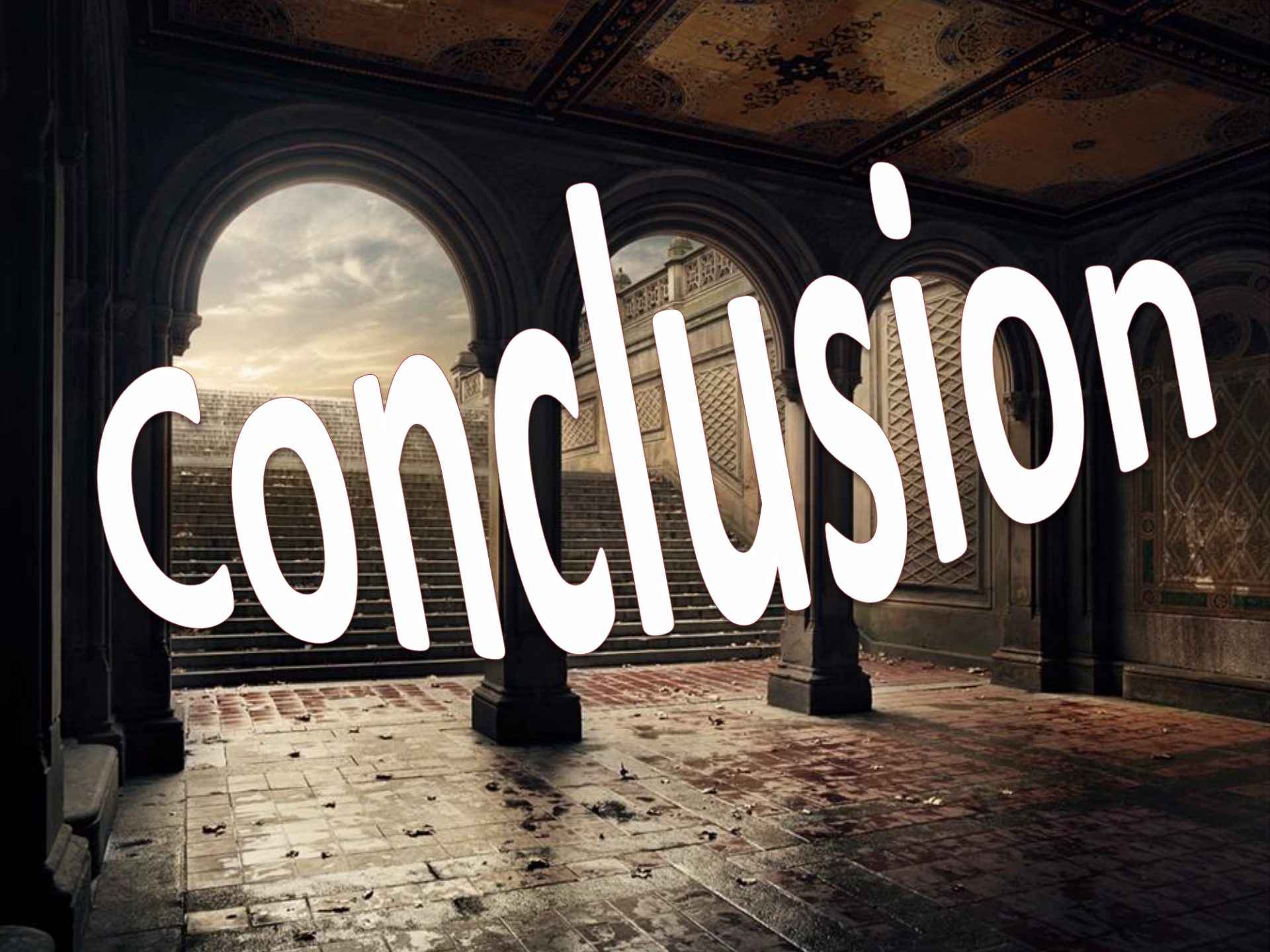
The aim of this study was to compare between the effect of treadmill and stationary bicycle as physical therapy approaches in decreasing of interleukin 6 in patients after renal transplantation.

Forty volunteers' patients of both sexes who undergone renal transplantation were selected and recruited randomly from police hospital. They were assigned into two groups equal in number; group A (20 patients) received aerobic exercise on treadmill device for 30 minutes, and group B (20 patients) received aerobic exercise on stationary bicycle for 30 minutes. The training program for patients in both groups was 3 times per week for 12 week, interleukin 6 was measured for all patients participated in the study before and 12 weeks after the training program.

The analysis of the results of the current study revealed a significant decrease in interleukin 6 level in both groups A and B and non significant difference between group A and group B after using aerobic exercise on treadmill and stationary bicycle. Statistical significance was established at the conventional 0.05 level.

These results were Supported by (Romano et al., 2010) who stated that exercise training consisting of thirty 40-minute sessions, three times a week, performed with the interval training technique decrease IL-6 from 2.8 ± 0.6 to 1.7 ± 0.5 pg/mL ($p < 0.01$) in renal transplant recipients. The results of this study agreed with results obtained by (Nicklas et al., 2009) who showed that a one-year physical activity intervention results in reduced systemic concentrations of IL-6 in elderly individuals at risk for disability. Despite these caveats, this study points to the benefit of regular physical activity even in the absence of weight loss as an effective therapy for reducing systemic concentrations of IL-6 in the elderly and similar responses were observed between men and women.

- In contrast results achieved by (Cheyne et al., 2010) showed that after the 10-wk exercise training period, the IL-6 concentration of both the exercise groups and the control group remained unchanged; however, a significant reduction in CRP concentration was experienced by the resistance training group.
- Finally it can be concluded that aerobic exercise on treadmill and stationary bicycle for 12 week in renal transplants patients significantly decrease level of interleukin 6 and prevents the morbidity cardiovascular risks associated with this patients. So it was recommended that renal transplants patients use our aerobic exercise to IL-6 more efficiently. The mechanism by which chronic exercise alter IL-6 concentrations in the circulation must be through either an inhibitory effect on IL-6 production or through a stimulatory effect on IL-6 clearance.


conclusion

The aerobic training should be recommended for renal transplant recipients due to its anti inflammatory effect which in turn helping in decreasing interleukin 6 level that improve overall quality of life for these patients.


THANK
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